

# Nanostructured Material for Accurate and Fast Tracking of Cryogenic Temperatures, Phase I

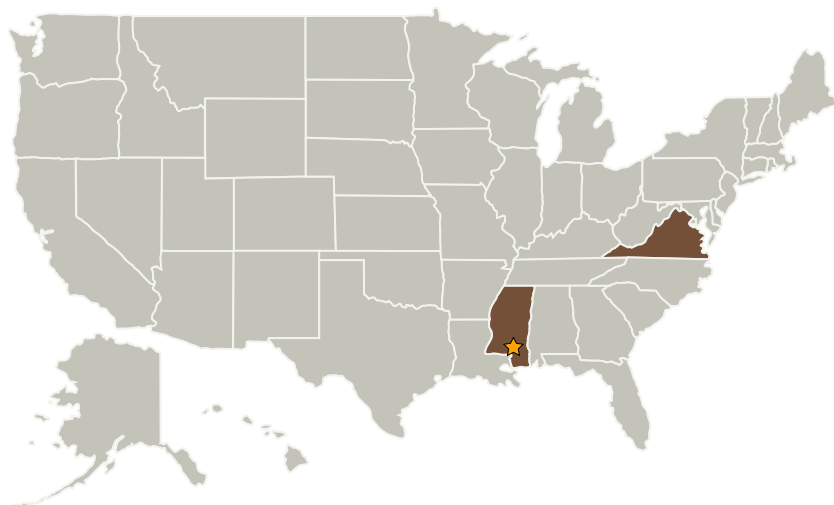
Completed Technology Project (2004 - 2004)



## Project Introduction

The use of cryogenic propellants in next-generation launch vehicles and rockets relies to a great extent on the availability of rugged, high accuracy (0.2%), fast response sensors to measure the temperature, flow and fluid levels under high pressure and high flow-rate conditions. Current cryogenic sensors suffer from a variety of defects such as inaccuracy, slow response, and narrow temperature range of operation. Materials Modification, Inc. proposes to overcome the above drawbacks with Nanotechnology. The aim of this proposed research is to use nanotechnology to improve the temperature-dependent electrical resistance of an RTD material for the fabrication of cryosensors. An in-house microwave plasma process will be used to synthesize nanoparticles of the sensor material, which will be used to fabricate a nanostructured cryosensor element, which is accurate, and exhibits fast response even under flow conditions. Subsequent Phase II work will aim at fabricating a commercial RTD using the nanostructured material.

## Primary U.S. Work Locations and Key Partners



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## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Stennis Space Center (SSC)

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Stennis Space Center(SSC)	Lead Organization	NASA Center	Stennis Space Center, Mississippi
Materials Modification, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB)	Fairfax, Virginia

## Primary U.S. Work Locations

Mississippi	Virginia
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## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

**Principal Investigator:**

Tirumalai Sudarshan

## Technology Areas

**Primary:**

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - └ TX12.3 Mechanical Systems
    - └ TX12.3.4 Reliability, Life Assessment, and Health Monitoring